262 Physiological responses of cardiovascular and muscle endurance in cystic fibrosis patients

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Aims: The aim of this study was to investigate the effects of pulmonary functions and peripheral muscle strength to physiological responses of cardiovascular and muscle endurance in patients with cystic fibrosis (CF). Fifteen patients with CF (15.6±4.87 years, Schwahman score: 74.27±11.23) participated in this study.
Methods: Pulmonary function test and six-minute walk test (6MWT) were performed. Peripheral muscle endurance was determined using sit-ups, squat and push-up tests. Heart rate, oxygen saturation (SpO_2), dyspnea and fatigue perception were recorded before and after 6MWT and endurance tests. Quadriceps femoris, biceps brachii, shoulder flexor muscles strength were evaluated.
Results: FEV_1 and FVC was correlated with percentages of maximal heart rate in 6MWT ($r=-0.58$, $r=-0.75$, respectively), sit-ups ($r=-0.63$, $r=-0.80$, respectively), push-up ($r=-0.59$, $r=-0.77$, respectively), squat ($r=-0.52$ $r=-0.67$, respectively); exercise SpO_2 in 6MWT ($r=0.55$ $r=0.61$, respectively), sit-ups ($r=0.75$, $r=0.76$, respectively), squat ($r=0.63$, $r=0.60$, respectively), mean push-up exercise SpO_2 ($r=-0.59$ $r=-0.65$, respectively), ($p<0.05$). Quadriceps muscle force was related with percentages of maximal heart rate in 6MWT ($r=0.61$), sit-ups ($r=0.63$), push-up ($r=0.68$), squat ($r=0.60$), ($p<0.05$). Percentage of maximal heart rate in push-up was related with biceps muscle force ($r=0.54$) and shoulder flexor muscle force ($r=0.52$), ($p<0.05$).
Conclusions: Physiological responses of cardiovascular and muscle endurance are affected with peripheral muscle strength and pulmonary function in CF patients.

263 Chest strength and mobility training: How do we do it?

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Following the presentation in Copenhagen CF conference, June 2006, which evaluated the effect of chest strength and mobility training as a new approach to airway clearance, we would like to describe the technique in detail.
The lung disease in Cystic Fibrosis results in hyperinflation, barrel chest and stiffening of the chest wall; which in turn affects efficiency of ventilation. As a result, the abdominal muscles are weak and the ability to raise the intra abdominal pressure is reduced. That leads to decreased expiration, reduction in airways clearance and increased air trapping perpetuating the vicious cycle.
The principles of chest strength and mobility training are: to increase thoracic capacity by mobilizing all the joints in the chest and trunk passively with physiotherapy techniques and actively by specific movements, stretching and strengthening the muscles of the frontal chest and diaphragm, shortening and strengthening the muscle of the back and scapula, increasing abdominal pressure by shortening and strengthening the abdominal wall, especially the internal and external oblique and transversus abdominis muscles. Training includes weight bearing exercises to strengthen the bones. In addition, the total work program improves coordination, balance and alignment.
This presentation would describe in detail the practical exercises that have been developed. These dramatically improve core strength and stability as well as chest mobilization. We hope our demonstration will enable others to apply this approach in routine daily CF care.

264 Clinical outcome and social parameters impact on sport activity in children with CF: a prospective survey

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Sport activities (SA) are important therapeutic options: it may slow down respiratory decline and has psychosocial impact.
Methods: a self administered questionnaire was sent to all the families with a child over 3 years of age evaluating SA at and out of school, school results, clinical parameters, family life style. Chi-square test (qualitative variables), Wilcoxon test (quantitative variables).
Results: 125 questionnaires (95%) were completed. 66m, 49f. Mean age: 11±4 y; 15, 34 and 45% were at nursery, elementary, junior/high school and 6% were older. 58% travelled to school by foot. School absenteeism was never for 29% and seldom for 57%. School results were good in 53%, poor in 13%. 62% participated to every SA at school, 4% to none and 34% electively avoided one activity (swimming). 77% had SA outside school, in a club for 70%, more than once a week for 33%. Leisure was the first motivation (77%) and 16% were practicing at a competition level. CF disease severity showed: FEV1 85%±25, FVC 91±20, z-score W 0.00±1.11 and z-score H 0.09±1.05. 75% children were living in a large city, 10% in small city and 15% rural. 19% lived in a single parent family. Life style was active in 21% and sedentary in 34%.
We found a strong positive correlation between SA and active life-style ($p<0.003$) and z-score W ($p<0.06$) but no correlation between SA and school results, age, city size, FEV1, level of schooling.
Conclusion: 77% integrated SA out of school, 16% at a competition level. Age, lung function, school results don't correlate with SA but active life-style and nutritional status correlate. We need to encourage families and children in SA to may ensure a long term practice in adulthood with expected medical benefits.

265 Relationship between nutritional status and muscle strength in patients with cystic fibrosis (CF)

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Aims: The purpose of this study was to determine the relationship between nutritional status, body composition, peripheral, and respiratory muscle strength in patients with cystic fibrosis (CF).
Methods: Fifteen patients with CF, aged 7–24 years, (mean FEV_1 = 72.26±23.24%) were included in the study. Pulmonary function test was performed. Nutritional status was evaluated using bioelectrical impedance analysis (BIA). Inspiratory and expiratory muscle strength (MIP and MEP, respectively) were measured using a mouth pressure device. Peripheral muscle strength was measured from quadriceps femoris, biceps brachii, and hand grip muscles using a hand held dynamometer.
Results: Body mass index was significantly correlated with quadriceps muscle strength ($r=0.58$, $p=0.024$), biceps muscle strength ($r=0.60$, $p=0.019$), hand grip muscle strength ($r=0.66$, $p=0.008$), and MIP ($r=0.69$, $p=0.005$). Fat free mass and total body water predicted from BIA was significantly related with quadriceps muscle strength ($r=0.56$, $p=0.030$), biceps muscle strength ($r=0.56$, $p=0.031$), hand grip muscle strength ($r=0.71$, $p=0.003$). Basal metabolic rate predicted from BIA was significantly correlated with FEV_1/FVC ($r=0.65$, $p=0.008$), PEF ($r=0.58$, $p=0.024$), FEF_{25-75} ($r=0.57$, $p=0.027$), and MIP ($r=0.57$, $p=0.026$).
Conclusions: Nutritional status may be a functional index of changes in peripheral muscle strength in CF.